



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
(Docket No. 400140)

In re the Application of: )  
DONALD K. JONES et al. )  
Serial No.: 09/880,506 ) Art Unit: 3743  
Filed: June 13, 2001 ) Examiner Kathryn Odland  
For: OCCLUDING VASCULATURE OF A )  
PATIENT USING EMBOLIC COIL WITH )  
IMPROVED PLATELET ADHESION )  
To: Commissioner for Patents ) RECEIVED  
P.O. Box 1450 ) MAY 26 2004  
Alexandria, Virginia 22313-1450 ) TECHNOLOGY CENTER R3700

**DECLARATION UNDER 37 C.F.R. SECTION 1.131**

I, Vladimir Mitelberg, declares as follows:

1. I am a co-inventor of the invention disclosed and claimed in the above identified application.
2. I have worked in the field of biomedical engineering, including embolization devices, for over eight years and in mechanical engineering for over twenty years.
3. It is my understand that U.S. Patent No. 6,280,457 to Wallace et al., filed June 4, 1999, has been cited by the Patent and Trademark Office in support of rejections of claims 1-4, 6-14, 16, 17, 20, and 27 of the above-identified application.
4. The invention of this application was made prior to June 4, 1999, the date of filing of U.S. Patent No. 6,280,457. More specifically, the invention was made and completed, and actually reduced to practice, all in the United States of America, prior to June 4, 1999, as evidenced by the attached exhibits.

5. Exhibit A is a date-redacted copy of an invention record disclosure signed by Donald Jones and me. Exhibit A reports on work performed by us and/or under our direction and control in the United States of America prior to June 4, 1999, in connection with making embolic coils for occluding the vasculature of a patient, which devices were made and reduced to practice before June 4, 1999.

6. With respect to Exhibit A (the invention record) referred to in paragraph 5 above, the photographs set forth in the last page of this invention record were taken by Donald Jones of the roughened coils prior to submitting them for evaluation. The page having the number 028122 shows service requests. The picture on the bottom is a service request in which the coils were submitted for evaluation. Four photomicrographs were taken as indicated by the middle box and these four microphotographs were the results of the service requests. These photomicrographs are on the page of Exhibit A following the service requests. All of these photographs and service requests were taken and made prior to June 4, 1999.

7. Exhibit B are date-redacted copies of experiments performed on baboons, in connection with occluding the vasculature of the baboons, which experiments were performed before June 4, 1999.

8. The work referred in paragraph 7 above, included ex-vivo tests outside of the body using the baboon. A silicone tube was connected to the artery of the baboon. Blood flow was through the silicone tube and back to the baboon. In the silicone tube, aneurysms were formed on the tube itself. A delivery catheter was used to place roughened embolic coils inside of the aneurysms, with the help of a pusher mechanism. Live blood was run through the system and radioactive platelets accumulated on the

coils. The coils used were textured 5 mm. complex coils. By using a gamma camera imager, the radioactivity was measured. Non-textured coils were also used. It was found that there were greater amount of platelets on the roughened coils then on the non-roughened coils. From these experiments we were able to conclude that the introduction of the textured coils in the aneurysm would enhance platelet adhesion.

9. In view of my experience in biomedical engineering (including embolization devices) prior to June 4, 1999, I was confident that the vasculature of a patient could be successfully occluded by providing a plurality of embolic coils having a proximal portion that is held by the detachment portion and a distal portion, with the proximal portion that is held by the detachment portion being relatively smooth and the distal portion having a relatively textured surface. I found that the textured surface provides improved platelet adhesion compared to a non-textured surface, to promote clotting. As a result of the experiments, I was confident that the embolization device having a roughened surface was suitable for placement in a catheter for being conventionally implanted with an introducer having a detachment portion to provide improved platelet adhesion compared to a non-textured surface, to promote clotting. Accordingly, in my view, the invention was reduced to practice on a date prior to June 4, 1999, because I was confident that clinical versions of the prototype could be sterilized and clinically used with success to embolize aneurysms in patients.

10. I hereby declare that all statements made herein and of my own knowledge are true, and that all statements made on information and belief are believed to be true; and I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or

imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and  
that such willful false statements may jeopardize the validity of the application or patent  
issued therefrom.

Date: May 11-2004

V. Mitelberg

Vladimir Mitelberg

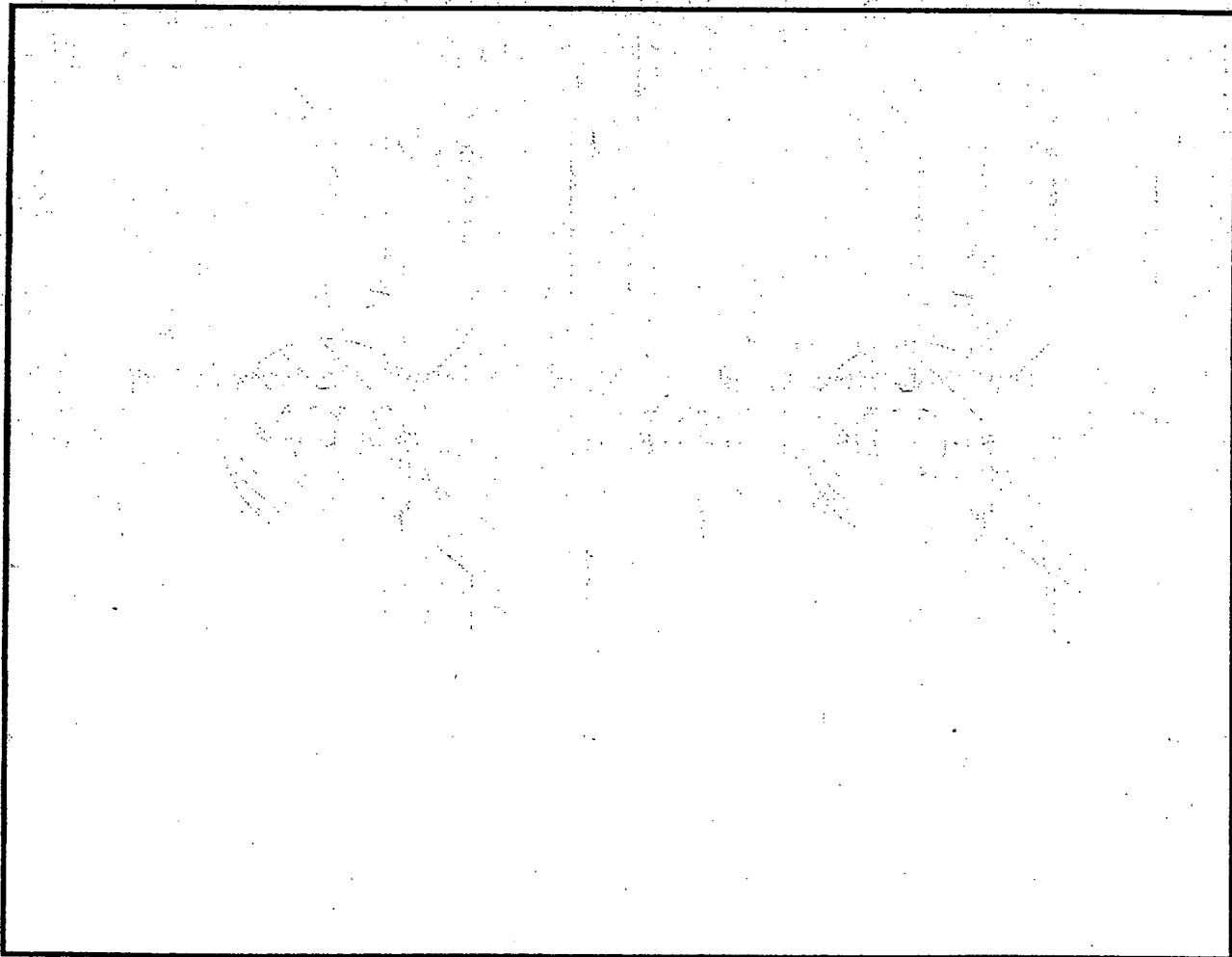
Cordis

DEPARTMENT

00/140

## DESCRIPTIVE TITLE: Coil Surface Modification

- I. INSTRUCTIONS: This form should be typed, except for the signatures and dates. Disclose only one invention on this Invention Disclosure form, and complete the entire form as fully as possible. Forward the completed form to the Legal Department, signed and dated by all inventors and two witnesses. Refer to this Invention Disclosure by the number assigned to it when receipt is acknowledged. Attach additional sheets if more space is required. Each original piece of paper must be signed and dated by every inventor and by each witness.
- II. ILLUSTRATION: *Include a drawing, sketch, photograph, flow chart, or preferably an engineering quality printout of the invention.*



Name &amp; Signature of Inventor(s):

Date

Witnesses

Date

A handwritten signature in black ink, appearing to read "V. Nijs".

A handwritten signature in black ink, appearing to read "Erdin".

A handwritten signature in black ink, appearing to read "Donald F. Jones".

A handwritten signature in black ink, appearing to read "Ken M. H.".

EXHIBIT A

## DEPARTMENT

III. EXPLANATION OF INVENTION: *Describe the invention completely, including all essential elements.*

The invention is a surface modified embolization coil. The surface has been textured by abrasion or "sand blasting". Fifty-micron diameter alumina particles were used to texture the surface of the platinum tungsten wire used to form the coils. It is believed that the textured surface provides improved platelet adhesion thus promoting clotting and subsequent endothelialization. SEM micrographs and optical pictures of the textured vs. non-textured are attached. Testing using radiolabeled platelets was conducted to evaluate an ex vivo aneurysm model. In the model, aneurysms treated with textured coils were compared to aneurysms treated with non-textured coils. The textured coils showed an increase in the platelet deposition of about 50% over the non-textured coils.

IV. NOVEL FEATURES AND ADVANTAGES: *What is new that was not previously known, and why is this important.*

Other surface modification techniques such as coating or ion implantation require expensive and elaborate equipment to modify the coils which add an additional component. This method does not impart any new materials to the coil that would require new biocompatibility testing and can be done inexpensively.

V. MODIFICATIONS: *Describe all possible modifications or alternate embodiments.*VI. RELATED DOCUMENTS: *List all known relevant art references (patents, publications, commercially available products, etc.). Please supply copies of the documents, if available.*

Patents:

Publications:

Signature of Inventor(s):

Date:

Witnesses:

Date:

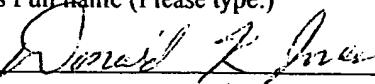
V. M. Eddy  
Donald R. Eddy

# DEPARTMENT

## VII. INVENTORS:

First Inventor's Full name (Please type):

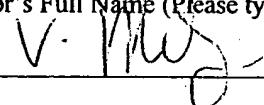
Donald K. Jones

Signature: 

Date: 

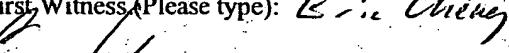
Second Inventor's Full Name (Please type):

Vladimir Mitelberg

Signature: 

Date: 

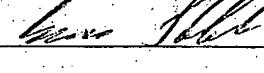
## VIII. WITNESSES: This invention was disclosed to and understood by:

Full Name of First Witness (Please type): 

Signature: 

Date: 

Full Name of Second Witness (Please type): 

Signature: 

Date: 

## IX. ADDITIONAL INFORMATION:

Invention is recorded on page(s): \_\_\_\_\_ of Notebook No.: \_\_\_\_\_ dated: \_\_\_\_\_

Earliest date: \_\_\_\_\_ and place: CES where inventors first thought of the present invention.

First written description (date and present location): \_\_\_\_\_

First sketch of the invention (date and present location): \_\_\_\_\_

Earliest date: \_\_\_\_\_ and place: \_\_\_\_\_ where first operating model was completed.

Present location of model: \_\_\_\_\_

Earliest date of use of the invention (actual or contemplated): \_\_\_\_\_

Earliest shipping date (actual or contemplated): \_\_\_\_\_

## Service Request

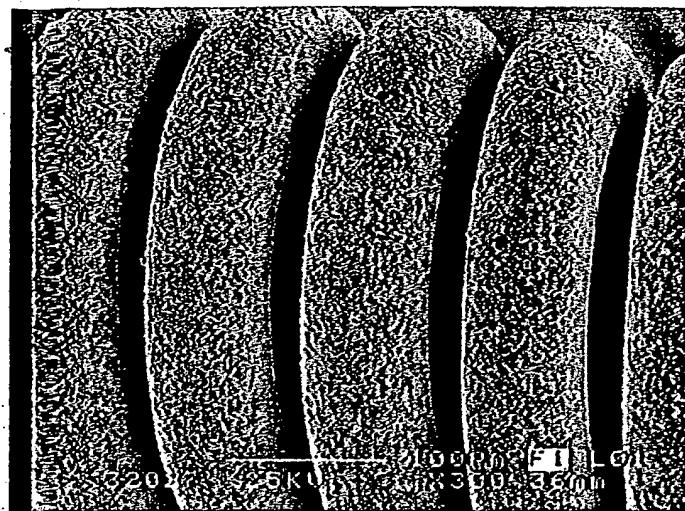
Job number, assigned by  
supplying organization

32027

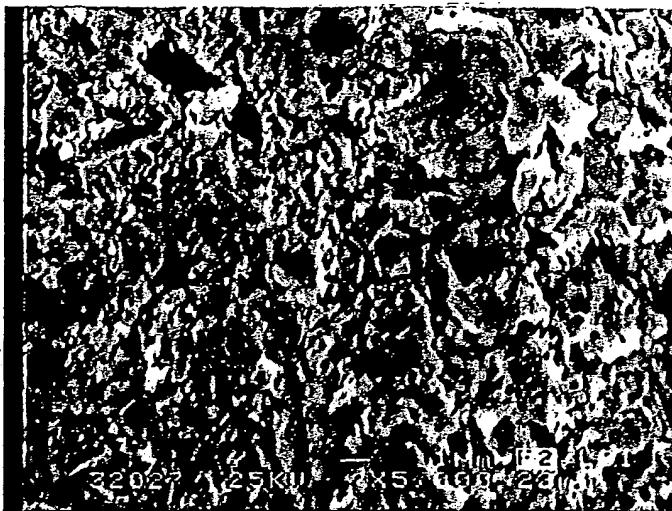
Requestor	To	CPQT 54 L CRIS	Project/Charge
	From (organization)	CES	Date required
	Location	(CETR) QUATRONES x 86020	
	For information contact		
	Description of request	86676 Please provide SETI photos of surface of cores provided for roughness evaluation.	
Requested by	P. Q. Alvarado		
Approved by			

Supplier	Date received	
	Labor cost	
	Material cost	
	Purchased Materials, services or equipment required	Workshop 92071-46
	Completion date	
Comments	Electron optical micrographs were taken of each sample at low & high magnifications to show surface roughness conditions.	
Estimate by	John Paul	

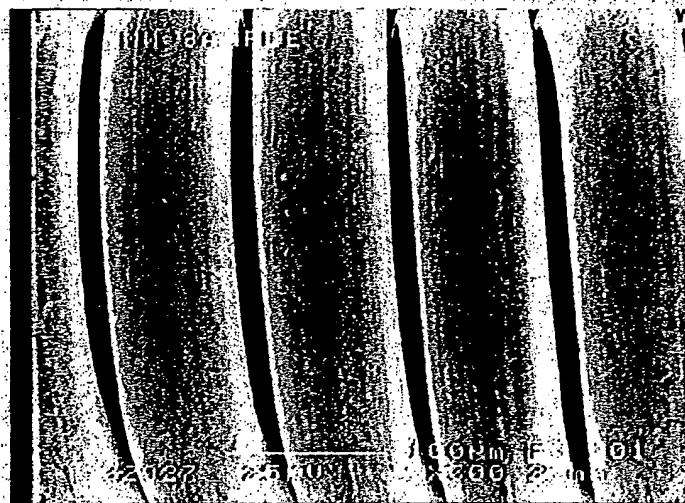
Approvals	Cost and completion date accepted by requestor		
	Signature	Date	
	Comment		
	F. J. Fair		
	Supplier acceptance by	B.R. Date	



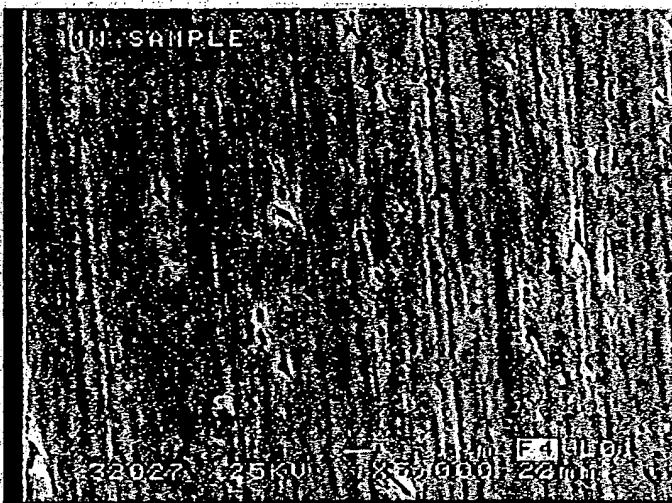
**Figure 1-(233x) Sample with rough surface**



**Figure 2-(3880x) Sample with rough surface**



**Figure 3-(233x) Sample "MW" with smooth surface.**



**Figure 4-(3880x) Sample "MW" with smooth surface.**

40 X mag

.003" P/M

5 min  
Complex  
(20-30 sec)

No Surface Treatment



W

PAT

DEPA

DKD

40 X mag

.003" P/M

5 min  
Complex  
(20-30 sec)

Surface Treatment



Surface Abraded Using AccuBRIDGE - 5 81003  
50 micron blend of Hg<sub>2</sub> (Part No. 49805)

DKD

A3		Pit Cnt Pre	314	Wt le Blood	171188
A341		Pit Cnt Post	267	Plasma	21908
G E		WBC	8.7	Fraction	92.5%
8 x 10 <sup>6</sup>		Hct Pre	41.10%	Free	7.5%
15%		Hct Post	38.00%	Volume (cc)	3
172		Flow (ml/min)	100 clamp		
247					
low		Blood Std CPM	2285		
med		Bkg CPM	291		
word		Bkgd CPM	11994		
byte		CPM In-pts	1843.696		
		CPM/ml In-pts	614.5654		
		ROI	FINIAL		
			0.000511		
Time		CPM	CPM	Thrombus	Standard
Min					Plts x10 <sup>6</sup>
155		1800	1250	550.00	0.000511
160		1800	1400	400.00	0.000511
165		1700	1260	440.00	0.000511
170		1800	1250	350.00	0.000511
175		1770	1270	500.00	0.000511
180		1850	1250	400.00	0.000511
185		1840	1270	370.00	0.000511
190		1730	1230	500.00	0.000511
195		1740	1240	500.00	0.000511
200		1820	1270	350.00	0.000511
205		1830	1230	400.00	0.000511
210		1720	1210	510.00	0.000511
215		1650	1230	420.00	0.000511
220		1690	1250	440.00	0.000511
225		1640	1120	520.00	0.000511
230		1580	1180	420.00	0.000511
235		1720	1150	570.00	0.000511
240		1520	1080	440.00	0.000511

Study Description  
**Aneurysm Run #7 textured 5mm dim. complex**  
 coils. Tail from Aneu. #1 extended 130mm.  
 Tail from Aneu.#2 extended 180mm

Computer  
 Data Partition  
 Camera  
 ROI (device)  
**8 x 10**  
 Window  
**15%**  
 Energy  
**> 172**  
 Collimator  
**> low**  
 Matrix  
**128**  
 Iodine  
 Remarks

#2	ROI	ROI	Time	CPM	CPM	CPM	bkg	Thrombus	Standard	Pits x10 <sup>3</sup>
6	216	169	47.00	0.000511	0.02					
10	255	224.00	31.00	0.000511	0.02					
15	267	255.00	12.00	0.000511	0.01					
20	428	341.00	87.00	0.000511	0.04					
25	551	431.00	120.00	0.000511	0.06					
30	665	583.00	82.00	0.000511	0.04					
35	902	798.00	104.00	0.000511	0.05					
40	1020	792.00	228.00	0.000511	0.12					
45	1170	892.00	87.00	0.000511	0.04					
50	1260	929.00	331.00	0.000511	0.17					
55	1300	947.00	353.00	0.000511	0.18					
60	1330	964.00	368.00	0.000511	0.19					
65	1360	998.00	362.00	0.000511	0.18					
70	1440	998.00	442.00	0.000511	0.23					
75	1510	985.00	525.00	0.000511	0.27					
80	1540	1020.00	520.00	0.000511	0.27					
85	1740	1100.00	640.00	0.000511	0.33					
90	1620	1040.00	580.00	0.000511	0.30					
95	1540	1000.00	540.00	0.000511	0.28					
100	1490	1050.00	440.00	0.000511	0.22					
105	1600	988.00	612.00	0.000511	0.31					
110	1600	892.00	708.00	0.000511	0.36					
115	1600	956.00	644.00	0.000511	0.33					
120	1680	903.00	777.00	0.000511	0.40					
125	1650	954.00	696.00	0.000511	0.38					
130	1680	892.00	788.00	0.000511	0.40					
135	1680	860	820.00	0.000511	0.42					
140	1770	806	964.00	0.000511	0.49					
145	1740	780	950.00	0.000511	0.49					
150	1700	844	856.00	0.000511	0.44					

#2	ROI	ROI	Time	CPM	CPM	CPM	bkg	Thrombus	Standard	Pits x10 <sup>3</sup>
6	216	169	47.00	0.000511	0.02					
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110	1600	892.00	708.00	0.000511	0.36					
115	1600	956.00	644.00	0.000511	0.33					
120	1680	903.00	777.00	0.000511	0.40					
125	1650</									

Computer		A3		A341		G E		8 x 10		15%		> 172		247		Flow (ml/min)		1000/clamp		Blood Std CPM		1672								
Data Partition		Pit Cnt Pre		295		Pit Cnt P st		204		WBC		11.5		Hct Pre		45.40%		Hct Post		42.10%		Bkg CPM		281						
Camera		Fraction		92.8%		Volume (cc)		3		Free		7.2%		CPM In-pits		1281.589		CPM/ml In-pits		427.1983		CPM		Thrombus						
ROI (device)		Window		Collimator		Matrix		128		ROI		ROI		ROI		ROI		ROI		ROI		ROI								
Study Description		Run #1 untextured 5mm dim. complex		Collimator		Matrix		128		ROI		ROI		ROI		ROI		ROI		ROI		ROI								
Aneurysm		Run #1 untextured 5mm dim. complex		Collimator		Matrix		128		ROI		ROI		ROI		ROI		ROI		ROI		ROI								
Aneurysm		Run #1 untextured 5mm dim. complex		Collimator		Matrix		128		ROI		ROI		ROI		ROI		ROI		ROI		ROI								
Remarks		#2. Tall from Aneu.#2 extended 16"		Collimator		Matrix		128		ROI		ROI		ROI		ROI		ROI		ROI		ROI								
Time		ROI		ROI		ROI		ROI		ROI		ROI		ROI		ROI		ROI		ROI		ROI								
Tim		43x43		43x48		CPM		CPM		CPM		CPM		CPM		CPM		CPM		CPM		CPM								
Min		CPM		CPM		CPM		CPM		CPM		CPM		CPM		CPM		CPM		CPM		CPM								
5	145.	103	42.00	0.000689	0.03	155	1070	804	266.00	0.000689	0.18	160	1120	756	364.00	0.000689	0.25	165	1140	796	344.00	0.000689	0.24	170	1210	760	450.00	0.000689	0.31	
10	162	165	3.00	0.000689	0.00	160	1160	1120	1160	0.000689	0.06	175	1160	800	360.00	0.000689	0.26	180	1130	804	326.00	0.000689	0.22	185	1210	846	364.00	0.000689	0.25	
15	229	194	35.00	0.000689	0.02	165	1237	3.00	1237	0.000689	0.00	170	1237	1270	900	370.00	0.000689	0.25	175	1270	928	342.00	0.000689	0.22	180	1270	948	402.00	0.000689	0.28
20	240	237	3.00	0.000689	0.00	170	1250	842	1250	0.000689	0.03	175	1250	1270	900	370.00	0.000689	0.25	180	1270	948	364.00	0.000689	0.25	185	1270	948	402.00	0.000689	0.28
25	323	242	81.00	0.000689	0.06	180	1320	24.00	1320	0.000689	0.02	185	1320	114.00	0.000689	0.04	190	1320	43.00	1320	0.000689	0.03	195	1320	948	364.00	0.000689	0.28		
30	331	307	24.00	0.000689	0.02	190	1320	806	1320	0.000689	0.08	195	1320	114.00	0.000689	0.03	200	1320	806	1320	0.000689	0.08	205	1320	948	364.00	0.000689	0.28		
35	398	344	54.00	0.000689	0.04	195	1320	43.00	1320	0.000689	0.03	200	1320	806	1320	0.000689	0.08	205	1320	806	1320	0.000689	0.08	210	1320	948	364.00	0.000689	0.28	
40	444	401	43.00	0.000689	0.03	200	1320	806	1320	0.000689	0.08	205	1320	806	1320	0.000689	0.08	210	1320	806	1320	0.000689	0.08	215	1320	948	364.00	0.000689	0.28	
45	506	396	110.00	0.000689	0.08	210	1320	806	1320	0.000689	0.09	215	1320	114.00	0.000689	0.08	220	1320	806	1320	0.000689	0.09	225	1320	948	364.00	0.000689	0.28		
50	538	406	132.00	0.000689	0.09	215	1320	806	1320	0.000689	0.08	220	1320	114.00	0.000689	0.08	225	1320	806	1320	0.000689	0.09	230	1320	948	364.00	0.000689	0.28		
55	575	461	114.00	0.000689	0.08	220	1320	806	1320	0.000689	0.11	225	1320	114.00	0.000689	0.11	230	1320	806	1320	0.000689	0.11	235	1320	948	364.00	0.000689	0.28		
60	633	478	155.00	0.000689	0.11	230	1320	806	1320	0.000689	0.13	235	1320	114.00	0.000689	0.13	240	1320	806	1320	0.000689	0.13	245	1320	948	364.00	0.000689	0.28		
65	668	486	182.00	0.000689	0.13	240	1320	806	1320	0.000689	0.10	245	1320	114.00	0.000689	0.10	250	1320	806	1320	0.000689	0.10	255	1320	948	364.00	0.000689	0.28		
70	660	512	148.00	0.000689	0.10	245	1320	806	1320	0.000689	0.16	250	1320	114.00	0.000689	0.16	255	1320	806	1320	0.000689	0.16	260	1320	948	364.00	0.000689	0.28		
75	800	563	237.00	0.000689	0.16	250	1320	806	1320	0.000689	0.20	255	1320	114.00	0.000689	0.20	260	1320	806	1320	0.000689	0.20	265	1320	948	364.00	0.000689	0.28		
80	814	528	286.00	0.000689	0.20	255	1320	806	1320	0.000689	0.18	260	1320	114.00	0.000689	0.18	265	1320	806	1320	0.000689	0.18	270	1320	948	364.00	0.000689	0.28		
85	883	644	239.00	0.000689	0.21	260	1320	806	1320	0.000689	0.22	265	1320	114.00	0.000689	0.22	270	1320	806	1320	0.000689	0.22	275	1320	948	364.00	0.000689	0.28		
90	938	816	322.00	0.000689	0.22	265	1320	806	1320	0.000689	0.19	270	1320	114.00	0.000689	0.19	275	1320	806	1320	0.000689	0.19	280	1320	948	364.00	0.000689	0.28		
95	924	650	274.00	0.000689	0.19	270	1320	806	1320	0.000689	0.11	275	1320	114.00	0.000689	0.11	280	1320	806	1320	0.000689	0.11	285	1320	948	364.00	0.000689	0.28		
100	958	688	270.00	0.000689	0.19	275	1320	806	1320	0.000689	0.13	280	1320	114.00	0.000689	0.13	285	1320	806	1320	0.000689	0.13	290	1320	948	364.00	0.000689	0.28		
105	922	694	228.00	0.000689	0.18	280	1320	806	1320	0.000689	0.20	285	1320	114.00	0.000689	0.20	290	1320	806	1320	0.000689	0.20	295	1320	948	364.00	0.000689	0.28		
110	964	674	290.00	0.000689	0.20	285	1320	806	1320	0.000689	0.22	290	1320	114.00	0.000689	0.22	295	1320	806	1320	0.000689	0.22	300	1320	948	364.00	0.000689	0.28		
115	986	664	322.00	0.000689	0.22	290	1320	806	1320	0.000689	0.19	295	1320	114.00	0.000689	0.19	300	1320	806	1320	0.000689	0.19	305	1320	948	364.00	0.000689	0.28		
120	959	652	307.00	0.000689	0.21	295	1320	806	1320	0.000689	0.18	300	1320	114.00	0.000689	0.18	305	1320	806	1320	0.000689	0.18	310	1320	948	364.00	0.000689	0.28		
125	897	666	231.00	0.000689	0.18	300	1320	806	1320	0.000689	0.22	305	1320	114.00	0.000689	0.22	310	1320	806	1320	0.000689	0.22	315	1320	948	364.00	0.000689	0.28		
130	872	680	212.00	0.000689	0.15	305	1320	806	1320	0.000689	0.20	310	1320	114.00	0.000689	0.20	315	1320	806	1320	0.000689	0.20	320	1320	948	364.00	0.000689	0.28		
135	986	700	296.00	0.000689	0.20	310	1320	806	1320	0.000689	0.18	315	1320	114.00	0.000689	0.18	320	1320	806	1320	0.000689	0.18	325	1320	948	364.00	0.000689	0.28		
140	1010	686	324.00	0.000689	0.22	315	1320	806	1320	0.000689	0.20	320	1320	114.00	0.000689	0.20	325	1320	806	1320	0.000689	0.20	330	1320	948	364.00	0.000689	0.28		
145	1030	754	276.00	0.000689	0.18	320	1320	806	1320	0.000689	0.22	325	1320	114.00	0.000689	0.22	330	1320	806	1320	0.000689	0.22	335	1320	948	364.00	0.000689	0.28		
150	986	704	282.00	0.000																										

Baboon 374Pleft

Date

Study Description

Computer

A341

Data Partition

G E

Camera

8 x 10

ROI (device)

Window

Energy

&gt; 15%

Hct Post

42.10%

Flow (ml/min)

100/clamp

Volume (cc)

3

Aneurysm Run #1 untextured 5mm.dlm. complex coils. Tail from Aneu. #1 stopped 1.25" from aneu. #2. Tail from Aneu. #2 extended 16"

flow stopped at 1hr 25min - shunt was flushed

Remarks

Collimator	> low	Flow (ml/min)	Blood Std CPM	1672
Matrix	med	Bkgd CPM	291	
word	wrd	CPM In-pits	1381	

> brief	ROI	ROI	Blood Std CPM	1672
	ROI	ROI	Bkgd CPM	291
	ROI	ROI	CPM In-pits	1281.589

CPM/min In-pits 427.1963

FINAL 0.0006891

#2	ROI	ROI	Time	Time	Time	Time	Time	Time
Time	16x72	16x68	CPM	CPM	CPM	CPM	CPM	CPM
Min			CPM bkg	Thrombus	Standard	Pits x10 <sup>3</sup>		
5	184	150	34.00	0.000689	0.02	155	510	206
10	190	168	22.00	0.000689	0.02	160	544	216.00
15	215	240	-25.00	0.000689	0.02	165	584	328.00
20	324	303	21.00	0.000689	0.01	170	568	248.00
25	493	442	51.00	0.000689	0.04	175	618	336.00
30	592	538	54.00	0.000689	0.04	180	576	0.000689
35	751	641	110.00	0.000689	0.08	185	638	0.000689
40	866	716	150.00	0.000689	0.10	190	614	0.000689
45	981	848	21.00	0.000689	0.01	195	622	240.00
50	1120	918	202.00	0.000689	0.14	200	740	378.00
55	1280	1050	230.00	0.000689	0.16	205	654	0.000689
60	1390	1050	340.00	0.000689	0.23	210	680	246.00
65	1650	1180	470.00	0.000689	0.32	215	690	352.00
70	1650	1250	400.00	0.000689	0.28	220	640	500.00
75	1570	1210	360.00	0.000689	0.25	225	704	412.00
80	1480	1200	280.00	0.000689	0.18	230	606	0.000689
85	1470	1140	330.00	0.000689	0.23	235	648	430.00
90	1660	718	942.00	0.000689	0.85	240	712	376.00
95	1790	458	1332.00	0.000689	0.92			
100	1750	466	1284.00	0.000689	0.88			
105	1760	434	1326.00	0.000689	0.91			
110	1830	460	1370.00	0.000689	0.94			
115	1810	466	1344.00	0.000689	0.93			
120	1510	380	1130.00	0.000689	0.78			
125	276	113	163.00	0.000689	0.11			
130	300	130	170.00	0.000689	0.12			
135	378	154	224.00	0.000689	0.15			
140	420	156	284.00	0.000689	0.18			
145	486	166	320.00	0.000689	0.22			
150	510	190	320.00	0.000689	0.22			